

Duration: 2 hours

[Max Marks:60]

- N.B. : (1) Question No 1 is Compulsory.  
(2) Attempt any three questions out of the remaining five.  
(3) All questions carry equal marks.  
(4) Assume suitable data, if required and state it clearly.

- 1 Attempt any THREE [15]
- a Explain data abstraction with its levels. [5]
  - b Explain types of keys with example. [5]
  - c What is functional dependency? What are its types? [5]
  - d Draw and explain transaction state diagram [5]
- 2 a What is entity and attribute? Explain type of entity and attribute with example. [8]
- b Explain overall structure of DBMS with suitable diagram [7]
- 3 a Consider the following relations. [8]  
Sailors: (Sid, Sname, Rating, Age)  
Boats: (Bid, Bname, Color)  
Reserves: (Sid, Bid, Day)
- Write relational algebra queries for the following:
- 1. Names of sailors who reserved a red boat
  - 2. Find colors of boats with names starting with 'C'
  - 3. Find names of sailors who have reserved boat no. 100
  - 4. Display sailor details who have rating at least 5
- b Explain function and procedure in SQL with example [7]
- 4 a Explain different types of joins in SQL with example [8]
- b Consider the following relation: [7]  
College(student\_id, course\_id, student\_name, course\_name, result, grade)  
Functional dependencies are:  
student\_id->student\_name  
course\_id->course\_name  
student\_id, course\_id->result  
result->grade  
Convert into 2NF and 3NF
- 5 a Explain Timestamp based protocol with example [8]
- b Explain integrity constraints in SQL with example [7]
- 6 a Explain conflict serializability with example [8]
- b Explain specialization, generalization and aggregation with example [7]